METHOD FOR MANUFACTURING DOOR MOLD AND DOOR PRODUCED USING THE SAME

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to a method for manufacturing a door mold and a door produced using a mold that is manufactured by the method. More particularly, the present invention relates to a method for manufacturing a door mold wherein etching depths in the mold are different in respective pattern forming processes when intending to form a predetermined pattern such as the grain of wood on the mold using an etching technique, and a door produced by using the door mold manufactured by the method.

2. Description of the Prior Art

Traditionally door has been made out of wood. While aesthetically pleasing, wood doors are expensive, more prone to warping, dimensional variation and weathering. Next evolution in alternative to wood door was steel door with insulating core. Although less expensive than wood doors, steel doors tend to dent, rust and feel cold to the touch. Furthermore steel door does not have the warmth and visual appeal of wood door. For some years, fiberglass doors have appeared in the construction market that provides distinct advantages of the wood door and steel door. The fiberglass doors are usually made of sandwiching two compression-molded fiberglass door skins with insulating foam core. Because the fiberglass skins are molded, it became possible to express wood grain pattern on the fiberglass skins to mimic wood grain texture. Hence, the fiberglass doors had aesthetically pleasing quality of wood doors and better insulation without the negative quality of wood doors such as high cost, cracking, splitting and weathering. However, existing attempt to truly express wood grain pattern and texture on a fiberglass door has been difficult or expensive.

SUMMARY OF THE INVENTION

The present invention is conceived to solve the aforementioned problems. An object of the present invention is to provide a method for manufacturing a door mold by which the grain or texture of wood can be almost completely expressed on a door and the door mold can also be mass-produced, and a door produced using the method.

According to an aspect of the present invention for achieving the object, there is provided a method for manufacturing a door mold which comprises a masking/sanding process of masking a non-etching area except an etching area of the mold and then finishing the etching area with sand to transfer a pattern on the etching area; a pattern forming process which comprises a pattern transfer step of transferring a film printed with the pattern onto the etching area of the mold, a correction step of correcting connection and non-matched portions of the pattern, a precise masking step of precisely masking the non-etching area of the mold for its protection, an etching step of performing an etching operation with chemicals selected in accordance with a mold material and the pattern, and a cleaning step of cleaning the etching area of the mold with an alkaline solution and/or a sanding step of finishing the etching area with sand; a mesh forming process which comprises a mesh transfer step of transferring a predetermined mesh onto the etching area using a spraying method after the pattern forming process has been completed, an etching step of performing an etching operation with chemicals selected in accordance with the mold material and the mesh, and a sanding step of finishing the etching area with sand; a polishing process of performing polishing treatment by spraying glass beads on the etching area such that the degree of polish of the etching area can be uniformly maintained; and a mask removal/inspection process of removing a mask material from the non-etching area of the mold and then performing anticorrosive treatment on the surface of the mold after the polishing process has been completed. Further, there is also provided a door produced using the mold that is manufactured by the method.

Preferably, the pattern forming process is repeatedly performed at least twice.

More preferably, the mesh forming process is repeatedly performed at least twice.

Further, it is preferred that etching depths in the mold during the pattern forming processes may be different from one another such that the depths of the pattern formed on

a surface of the door can be different.

With the method for manufacturing the door mold so constructed according to the present invention, the grain or texture of wood can be almost completely expressed on the door and the door mold can also be mass produced.

BRIEF DESCRIPTION OF THE DRAWING

The above and other objects, features and advantages of the present invention will become apparent from the following description of a preferred embodiment given in conjunction with the accompanying drawing, in which:

FIG. 1 illustrates a process of manufacturing a door mold according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, a method for manufacturing a door mold according to a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawing.

FIG. 1 illustrates a method for manufacturing a door mold according to the present invention. Referring to the figure, the method for manufacturing the door mold generally comprises a masking/sanding process S100, a pattern forming process S200 for causing a predetermined pattern to be formed on an etching area of the mold, a mesh forming process S300 for causing a predetermined mesh to be formed on the etching area of the mold, a polishing process S400, and a final mask removal/inspection process S500. The pattern and mesh forming processes may be repeatedly performed at least twice. It is apparent that the number of repetition of the processes can be somewhat increased depending on the degree of expression for the grain or texture of wood.

When a mold is prepared, a state of the mold is first checked by confirming whether a welding process should be performed while manufacturing the mold, what is the material of the mold, to what extent the etching process should be performed, and the like. Then, a preparation step for removing foreign substances from a surface of the mold and cleaning the surface of the mold is performed.

Thereafter, in order to manufacture the door mold, the masking/sanding process S100 for masking a non-etching area except the etching area of with a tape and cleaning the etching area of the mold and then and sanding the mold surface to transfer the predetermined pattern onto the etching area is performed.

After the above process has been completed, the pattern forming process S200 for causing the pattern to be formed on the etching area of the mold is now performed. In such a case, to transfer a desired pattern such as the grain of wood onto the mold, a film printed with a relevant pattern is first cut out in accordance with a shape of the mold so that the pattern can be carefully transferred onto the etching area of the mold (S210). After the relevant pattern has been transferred, connection and non-matched portions of the pattern are corrected by using acid resistant ink. At this time, the correction should be made so carefully that the connection and flow of pattern are smoothly maintained and the correction ink is not smeared on an area on which the pattern is not formed (S220). Then, the non-etching area such as edge portions of the mold is precisely masked so that the non-etching area of the mold can be fully protected (S230).

After the etching and non-etching areas of the mold are carefully divided as such, acid chemicals suitable for the mold material and the pattern are selected so that the etching operation can be performed. At this time, the etching operation should be performed so carefully that an etching depth in the entire etching area can be uniform by always checking the etching depth using a depth gauge (S240). Thus, the etching area of the mold except the non-etching area is etched with the chemicals and is then lowered to a certain depth after a given time period. As a result, the non-etching area of the mold corresponds to a shape of the grain of wood, which gets deeply dug from a surface of a finished door by a constant depth.

Then, a cleaning operation for clearly removing the foreign substances remaining on the mold surface by cleaning the acid chemicals remaining on the etching area of the mold with an alkaline solution and removing the masking tape and/or a sanding operation for finishing the etching area of the mold with sand so as to completely remove the foreign substances are performed (S250).

Furthermore, the pattern forming process S200 of the present invention should be

repeatedly performed at least twice. At this time, it is most important that the etching depth in the subsequent etching step of the pattern forming process be different from that in the previous etching step of the pattern forming process. To this end, the time periods in the etching steps should be accurately controlled and the etching operation should also be performed while always confirming whether the entire etching area of the mold can be uniformly etched at the constant depth, using the depth gauge.

Therefore, due to the pattern forming process S200 performed at least twice as described above, the pattern is formed to have a total etching depth corresponding to the sum of the etching depth in the previous pattern forming process and the etching depth in the subsequent pattern forming process. As a result, the finished door is produced in such a manner that the deepest pattern thereof corresponds to the non-etching area of the mold that has not been etched during the previous pattern forming process and the next deeper pattern thereof corresponds to the non-etching area of the mold that has not been etched during the subsequent pattern forming process. Therefore, since the etching depth difference in the pattern is produced as such, the grain of wood can be almost completely expressed on the finished door.

Accordingly, it is apparent that more natural curly grain can be expressed by varying the depth of the curly grain. Consequently, it is also apparent in the present invention that the number of repetition for the pattern forming process S200 can be somewhat increased depending on the degree of expression for the grain of wood.

After the pattern forming process S200 has been completed, the mesh forming process S300 for transferring the predetermined mesh onto the entire etching area of the mold using the spraying method will be performed. The mesh forming process is basically performed to express the texture of wood on the door.

According to the mesh forming process S300, the predetermined mesh is first transferred onto the entire etching area of the mold using the spraying method (S310) and the etching area of the mold is then etched with the chemicals selected in accordance with the mold material and the mesh while controlling the time period such that the etching depth in this etching operation can be relatively smaller than that in the pattern forming process (S320). After the etching operation, the sanding operation for finishing the

etching area of the mold with sand will be immediately performed (S330).

Furthermore, the mesh forming process S300 of the present invention is repeatedly performed at least twice. At this time, it is also most important that the etching depth in the subsequent etching step of the mesh forming process be different from that in the previous etching step of the mesh forming process. As a result, since the etching depth difference in the mesh is produced on an entire surface of the finished door, the texture of wood can be almost completely expressed on the finished door. According to the present invention, it is preferred that the etching depth in mesh forming process be within a range of 0.02 to 0.05 mm in consideration of the etching depth in the pattern forming process. Thus, it can be seen that the natural texture of wood can be expressed very well on the surface of the finished door such that it is well in harmony with the pattern.

Accordingly, it is apparent that more natural texture of wood can be expressed by varying the etching depth formed by the mesh pattern. Consequently, it is also apparent in the present invention that the number of repetition for the mesh forming process can be somewhat increased depending on the degree of expression for the texture of wood.

In addition, after the mesh forming process has been completed, the polishing process S400 for polishing the mold surface to a certain extent by spraying solid particles with high-pressure air onto the surface so as to allow the mold surface to be uniformly polished will be performed.

Generally, the degree of polish may vary according to a ratio of the solid particles used in the polishing process. In such a case, glass beads and sand are widely used as the solid particle. At this time, a case where only 100 vol% of glass beads in the ratio (by volume) of the two solid particles is used is referred to as "glossy", whereas the other cases are referred to as "matte".

In the meantime, the ratio of the solid particles can be changed suitably according to the degree of polish. It can be seen from the present invention that the natural beauty and the texture of wood can be optimally expressed on the surface of the finished door when the door surface is polished with a mixture of the solid particles consisting of 70 to 99 vol% of the glass beads and 1 to 30 vol% of sand.

After the polishing process S400 has been completed, the mask removal/inspection

process S500 for completely removing the masking tape from the non-etching area of the mold and performing anticorrosive treatment for the entire mold surface is performed as a final finish process in the method for manufacturing the door mold according to the present invention.

Meanwhile, a door can be manufactured using the door mold manufactured as such. At this time, the door is made from a thermosetting resin such as polyester SMC (sheet molding compound).

The door so manufactured can be mass produced using the mold, and both the natural grain of wood and the superior texture of wood can be also expressed on the surface of the finished door. As a result, the door manufactured using the door mold according to the present invention allows a purchase desire of a consumer to be increased and the increase in profit due to the quality enhancement of products is also expected.

The present invention has been described in connection with the method for manufacturing the door mold wherein the pattern forming processes of forming the predetermined pattern on the mold surface are performed several times and the etching depths in the pattern and mesh forming processes are different from one another, and the door produced using the method. However, it is apparent that the technical spirit of the present invention can be applied to surfaces of wardrobes and tables or to furniture and construction materials substituting for the material wood.

According to the present invention, the grain or texture of wood can be almost completely expressed on the door by varying the depths of the patterns formed on the surface of the door. Therefore, the effect of import substitution of the expensive material wood is expected.

Further, the purchase desire of the consumer can be increased and the increase in profit due to the quality enhancement of products is also expected. Furthermore, since the products can be mass produced by using the mold, their productivity can be improved.